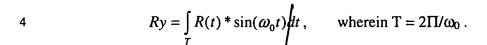
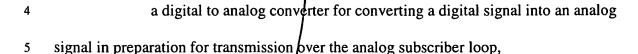
I Claim:

- 1. A method of correcting for a phase offset between a subscriber and
- 2 a service provider, comprising:
- sending a training signal from the subscriber to the service provider, the
- 4 service provider being synchronized to a network clock,
- 5 receiving the training signal at the service provider,
- 6 calculating the phase offset between the subscriber and the service
- 7 provider based upon the received training signal,
- 8 transmitting the calculated phase offset from the service provider to the
- 9 subscriber, and
- pre-adjusting a new signal transmitted from the subscriber to the service
- provider based upon the transmitted phase offset.
 - 1 2. The method according to claim 1, wherein the calculating step
- 2 further comprises modulating the received training signal by a cosine function to generate
- a signal Rx and modulating the received training signal by a sine function to generate a
- 4 signal Ry.
- 1 3. The method according to claim 2, wherein
- 2 R(t) = the received training signal,
- ω_0 = the base frequency of the training signal, and
- 4 $Rx = \int_{T} R(t) * \cos(\omega_0 t) dt$, wherein $T = 2\Pi/\omega_0$.
- 1 4. The method according to claim 2, wherein
- 2 R(t) =the received training signal,
- ω_0 = the base frequency of the training signal, and



- The method according to claim 2, further comprising the step of
- determining the phase offset, Δt , as a function of the arctangent (Rx/Ry).
- 1 6. The method according to claim 5, wherein
- 2 the phase offset $\Delta t = (1/\omega_0)^*$ arctangent $(Rx/Ry) + n t_0$,
- wherein t_0 = the time delay at the service provider side.
- 7. The method according to claim 1, wherein the step of transmitting
- 2 the calculated phase offset further includes transmitting a calculated time delay at the
- 3 service provider side, t₀.
- 1 8. The method according to claim 7, further including the step of pre-
- 2 adjusting the new signal transmitted from the subscriber to the service provider based
- 3 upon the transmitted phase offset and the transmitted time delay at the service provider
- 4 side.
- 1 9. The method according to claim 1, further including the step of
- transmitting the pre-adjusted new signal such that the new signal is in phase with the
- 3 network clock when the new signal is received at the service provider.
- 1 10. The method according to claim 1, wherein the pre-adjusting step
- 2 further includes adjusting the phase of a clock signal in the subscriber by the transmitted
- 3 phase offset.
- 1 11. A subscriber operably coupled via an analog subscriber loop to a
- 2 service provider, the service provider being synchronized with a network clock, wherein
- 3 the subscriber comprises:

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- an analog to digital converter for converting received analog signals,
- 7 received from the analog subscriber loop, into a received digital signal,
- a clock recovery circuit for recovering a clock signal from the received
- 9 digital signal, and
- a control element that generates a phase adjusted clock signal by adjusting
- the phase of the recovered clock signal by a phase offset, the phase offset being based
- upon the arctangent of a training signal modulated by the service provider,
- wherein a subsequent conversion by the digital to analog converter is
- synchronized to the phase adjusted clock signal such that signals transmitted by the
- subscriber are in phase with the network clock when received at the service provider.
 - 1 12. The mode in accordance with claim 11, wherein the phase offset,
- 2 Δt, is determined based upon the arctangent (Rx/Ry), wherein

$$Rx = \int_{T} R(t) * \cos(\omega_0 t) dt, \text{ and}$$

$$Ry = \int_{T} R(t) * \sin(\omega_0 t) dt,$$

- 5 wherein $T = 2\Pi/\omega_0$
- R(t) = a training signal sent from the subscriber to the service provider,
- 7 and
- 8 ω_0 = the base frequency of the training signal.



- 2 service provider and a subscriber operably coupled to the service provider, the service
- 3 provider comprising:
- 4 a cosine modulator for modulating a training signal received from the
- 5 subscriber by a cosine function to generate a signal Rx,
- a sine modulator for modulating a training signal received from the
- 7 subscriber by a sine function to generate a signal Ry, and
- a processor for determining the phase offset based upon the arctangent
- 9 (Rx/Ry).
- 1 The service provider according to claim 13, wherein the modulator
- 2 generates the signals Rx and Ry in accordance with the following equations:

$$Rx = \int_{T} R(t) * \cos[\omega_0 t] dt, \text{ and}$$

$$Ry = \int_{T} R(t) * \sin(\omega_0 t) dt,$$

- 5 wherein $T = 2\Pi/\omega_0$
- R(t) = a training signal sent from the subscriber to the service provider,
- 7 and
- 8 ω_0 = the base frequency of the training signal.
- 1 15. The service provider according to claim 14, wherein the phase
- offset, Δt , is determined by the processor in accordance with the following equation:

$$\Delta t = (1/\omega_0) * \operatorname{arctangent} (Rx/Ry) + n - t_0,$$

- 4 wherein $t_0 = the time delay at the service provider side, and$
- n = a constant.